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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,377	06/20/2003	Chien-Chou Hou	B-5130 621033-6	8506

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EXAMINER

DEO, DUY VU NGUYEN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 01/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/600,377	HOU ET AL.	
	Examiner	Art Unit	
	DuyVu n. Deo	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1-20.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-10, 12-15, 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner et al. (US 6,204,130) and admitted prior art.

Gardner teaches an etching method comprising: providing a patterned polysilicon (claimed silicon) (col. 4, line 15-33); forming an oxide layer (claimed etching buffer layer) by oxygen treatment and H₂O (claimed etching agent) (col. 4, line 34-43) conformally on the surface and the top layer of the patterned polysilicon layer (col. 4, line 34-43); etching the oxide layer to reduce the thickness of the polysilicon layer (col. 4, line 46-col. 5, line 10). Since the oxide removed is made from the polysilicon, the exposed polysilicon would also be etched when the oxide is removed from the polysilicon surface, in which the thickness of the polysilicon would be reduced. The etching of the polysilicon would inherently produce etching residues on the sidewalls thereof (please page 1 of the specification). Unlike claimed invention, Gardner doesn't describe etching the etching residues from the pattern silicon layer. However, one skilled in the art at the time of the invention would find it obvious to remove the etching residues so that it doesn't create a problem that is known to one skilled in the art such as interfering with

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the process of reducing the pattern silicon layer in a later process (please see page 1, line 20-page 2, line 2 of the specification).

Referring to claims 7, 8, 14, 15 the polysilicon is patterned by using a photoresist layer (claimed patterned mask).

Referring to claims 2, 3, 9, 10, 14, 19, the oxide layer is formed by thermal oxidation of using oxygen (col. 4, line 34-41). This would form claimed silicon oxide (SiO_2).

Referring to claims 6, 13, and 18, the thickness of the polysilicon pattern is 100-300 nm (col. 4, line 13).

Referring to claims 5, 12, 17, Gardner doesn't describe the thickness of the oxide (etching buffer layer) is about 5-20 nm. However, he teaches that the oxide layer growth can vary and suitably selected in consideration of the desired final thickness of the remaining polysilicon pattern (col. 4, line 44-54). Therefore, it would have been obvious for one skilled in the art to determine the thickness of the oxide layer through routine experimentation depending on the final desired thickness of the patterned polysilicon as suggested by Gardner.

Referring to claim 20, Gardner doesn't describe the thermal oxidation is performed at about 10-90 degrees C. However, it would have been obvious for one skilled in the art to determine the processing parameters including the T through routine experimentation in order to provide optimum T for the oxidation of the polysilicon with a reasonable expectation of success.

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3. Claims 4, 11, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner and admitted prior art as applied to claims 1, 7, 14 above, and further in view of Schloesser et al. (US 5,977,589).

Referring to claims 4, 11, and 16, even though Gardner doesn't describe using gas such as Cl₂ for etching of the oxide; however, he suggests that plasma-chemistry can be used for the etching (col. 5, line 9). Schloesser teaches that Cl₂ can be used for etching oxide layer (col. 8, line 42-46). It would have been obvious for one skilled in the art to etch the oxide layer in light of Schloesser's teaching because he further teaches gas that is silent in Gardner in order to etch the oxide layer with a reasonable expectation of success.

Response to Arguments

4. Referring to applicant's argument that Gardner doesn't show the oxide layer is created on the patterned silicon layer, please see fig. 2E showing an oxide layer 211 is formed on the pattern silicon layer 210. Also, Gardner describes the oxidation using O₂ and H₂O, which would read on claimed etching agent.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n. Deo whose telephone number is 571-272-1462. The examiner can normally be reached on 6:00-2:30 Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Primary Examiner

Duy-Vu N. Deo

1/9/06

